

REMARKS

1. Applicant thanks the Examiner for his remarks and observations which have greatly assisted Applicant in responding.

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35 U.S.C. § 102

2. Claims 1-2, 4, 8 and 10-14 stand rejected under 35 U.S.C. § 102(a) as being unpatentable over Kate, et. al (D1). Applicant respectfully disagrees.

10 Applicant first provides a short summary of the main features of the present invention before discussing the Office Action in detail.

15 Claim 1 is directed to introducing information into a data stream including data about spectral values representing a short-term spectrum of an audio signal. Thus, the input into the claim 1 method is, for example, a transform-encoded signal.

20 However, as described below, the publication by Kate does not operate on a data stream as defined in the first paragraph of page 1. Instead, document D1 works on a time-domain signal M as can be clearly seen in Fig. 1 or as it is outlined in the left column of page 1098, second paragraph, wherein it is outlined that the signal M is "first filtered into sub-bands". In order to filter a signal into a sub-band, the signal has to be given in the time-domain rather than in the spectral domain as defined
25 in the first paragraph of claim 1.

30 Furthermore, the inventive feature is that the data signal is spread via a spread sequence to obtain a spread information signal, which is then, after a time/frequency transform, combined with the spectral values of the short-term spectrum of the audio signal.

Document D1 and all other references cited by the Examiner are completely silent on any spread sequence and on any spreading operation.

35 Independent method claim 11 is different from claim 1 and has as the decisive feature that the noise energy introduced by quantizing is

smaller than the psychoacoustic masking threshold by a predetermined amount. To the contrary, document D1 teaches to quantize as coarse as possible, i.e., determines the maximum signal level which can be masked in each sub-band as defined in the third paragraph in the left column of page 1098. Thus, in accordance with claim 11, the audio signal is deliberately quantized not as coarse as possible but is quantized finer so that even when additional information is added, this additional information is masked and is, therefore, inaudible.

Below, Applicant discusses the Office Action and the Examiner's arguments.

Regarding the first paragraph of claim 1, the Examiner refers to "column 5, lines 11 to 25".

However, Applicant cannot locate this passage in document D1, since the fifth column of this reference, i.e., the left column of page 1099 does not include this kind of wording.

Furthermore, the Examiner has completely overlooked that the "audio and/or video information is different from a data stream including data about spectral values representing a short-term spectrum of an audio signal". Any audio or video information can, for example, also be a time-domain signal which, of course, does not have data about spectral values representing a short-term spectrum of an audio signal.

Regarding the step of processing, the Examiner refers to page 1097, right column, first paragraph. However, it is described here that a signal is filtered by a filter bank into sub-band signals. However, the signal filtered by the filter bank is different from a data stream including data about spectral values representing a short-term spectrum of an audio signal. Instead, the signal is a time-domain signal which is filtered by a filter bank and, therefore, is not a data stream including data about spectral values representing a short-term spectrum of the audio signal.

Regarding the step of combining in the third paragraph of claim 1, the Examiner refers to the Abstract. Of course, an "inaudible addition of extra information to an audio signal" is different from combining

information with a spread sequence to obtain a spread information signal. One could compare the "information" to the "extra information" in the Abstract. However, document D1 is completely silent on spreading the extra information by "using a spread sequence".

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To this end, Applicant respectfully directs the Examiner to block 32 in Fig. 2, which does not have any correspondence in document D1.

Regarding the step of generating, the Examiner refers to page 1097, right column, first paragraph. It is true that document D1 discloses sub-band-filtering the auxiliary signal A. However, the auxiliary signal is not a "spread information signal" and the spectral representation is not a spectral spread information signal.

15 Regarding the weighting step, the Examiner refers to page 1097, left column, second to fourth paragraph. However, the second paragraph only states the following sentence: "the inaudibility is guaranteed if the sound power level of the added signal is kept below the masking threshold."

20 Additionally, this passage does not say that a spectral spread information signal is weighted using the established noise energy for the audio signal. Instead, when page 1098, right column, equation 4 is considered or when the factor g in the left lower portion of Fig. 3 is considered, it becomes clear that the factor g depends on a quantization step, but does not
25 constitute a weighting of the spectral spread information signal using the established noise energy as defined in the sixth paragraph of claim 1.

Regarding the final step of processing saying that processing is performed such that a processed data stream including the data about the spectral values of the short-term spectrum of the audio signal and the information to be introduced is obtained, the Examiner refers to the second, third and fourth paragraphs of the left column of page 1097. However, this passage does not include any information on processing so that a processed data stream is obtained having any information about the spectral values of the short-time spectrum of the audio signal and the information to be introduced. Instead, when Fig. 1 or particularly Fig. 3 is considered, the output of the processing is processing both the signals after a

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combination in a synthesis filter bank so that a time-domain signal is obtained which does not include anymore any information on spectral values of the short-term spectrum of the audio signal and the information to be introduced. Therefore, document D1 also does not fulfill the last step of claim 1.

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Applicant emphasizes, however, that the main difference is that document D1 is completely silent on the step of combining the information with a spread sequence to obtain a spread information signal and that the invention is directed to a spectrally given data stream rather than a time domain signal.

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A detailed description of a preferred embodiment of the spread spectrum procedure is in the last paragraph of page 22, line 30 to page 23, line 21.

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The combination of the information with the spread sequence makes sure that the spectrum of the information signal before spreading is equalized. When the information signal included information concentrated in a small band, then this information is distributed over a larger frequency band using the spread sequence so that preferably the whole bandwidth of the audio signal can be used for introducing inaudible information.

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When, however, document D1 is considered, and when it is assumed that the auxiliary signal A only has a significant energy within a certain band, the masking ability of the audio signal (main signal M in document D1) in other bands than the specific band can not be used by the auxiliary signal for introducing inaudible information into the main signal. Thus, the document D1 ability for introducing inaudible information into the main signal is very limited. This situation becomes even worse, when the main signal has a certain band, which has a very low-volume signal, while the auxiliary signal has significant energy in this band, which can then not be inaudibly introduced into the specific band of the main signal.

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By contrast, the present invention, by combining the information signal using the spread sequence, spreads the energy in the information signal over e.g. the whole bandwidth. Then, the spread information signal is transformed into the frequency domain to obtain the spectral spread information signal, which is then weighted using the mask-able noise energy as the function

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of frequency established in the step of establishing so that a larger frequency range of the audio signal is used for introducing inaudible information, while, document D1 cannot use such a larger frequency range because document D1 does not perform any spreading of the information using a spread sequence.

As document D1 is completely silent on any spreading sequences, document D1 does not teach or suggest the subject matter of the present invention as defined by claim 1. Accordingly, claim 1 is both novel and inventive over D1. In view of their dependency from an allowable claim, the dependents are deemed to be allowable without any separate consideration of their merits.

Regarding claim 11, the main difference is that the step of quantizing in the fourth paragraph of claim 11 is performed such that the noise energy introduced by quantizing is smaller than the psychoacoustic masking threshold by a predetermined amount.

This is in clear contradiction to conventional quantizers, which always quantize as coarse as possible, i.e., they quantize so that the noise energy introduced by quantizing is equal to the psychoacoustic masking threshold rather than smaller than the psychoacoustic masking threshold by a predetermined amount, as defined in the invention.

Document D1, as well as all other references, says that the maximum signal level which can be masked in each sub-band is to be used as outlined in the left column of the third paragraph, lines 3 to 5 of page 1098.

Thus, the Examiner's statements in the first paragraph of claim 6 of the Office Action are not justified, since the Examiner completely overlooked the inventive feature regarding the step of quantizing. Accordingly, the present rejection of claim 11 is deemed to be improper.

Regarding claim 12, the Examiner refers to document D1, page 1098, left column, first to third paragraphs and states that "the predetermined amount is the estimated sub-band".

However, this is not true, since claim 12 explicitly states that such information for the value of the predetermined amount is included in the bit stream. The predetermined amount is the difference between the noise energy introduced by quantizing and the masking threshold. How can this be an "estimated sub-band?" Furthermore, document D1 does not say that such an estimated sub-band is included in a bit stream, since document D1 is completely silent on a bit stream. Accordingly, the present rejection of claim 12 is deemed to be improper.

3. **35 U.S.C. § 103**

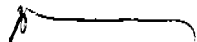
Claims 3, 5-7 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kate in view of U.S. Patent No. 6,300,588 ("Chen"). Applicant respectfully disagrees. In view of the above remarks regarding claim 1, the present application is deemed to be improper.

Claims 5-7 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kate in view of U.S. Patent No. 5,623,577 ("Chen"). Applicant respectfully disagrees. In view of the above remarks regarding claim 1, the present application is deemed to be improper.

CONCLUSION

In view of the above, the Application is deemed to be in allowable condition. Therefore, Applicant earnestly requests reconsideration and prompt allowance of the claims. Should the Examiner deem it helpful, he is urged to contact Applicant's attorney, Michael A. Glenn at 650-474-8400.

Respectfully submitted,



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